AC No.: 150/5340-24A
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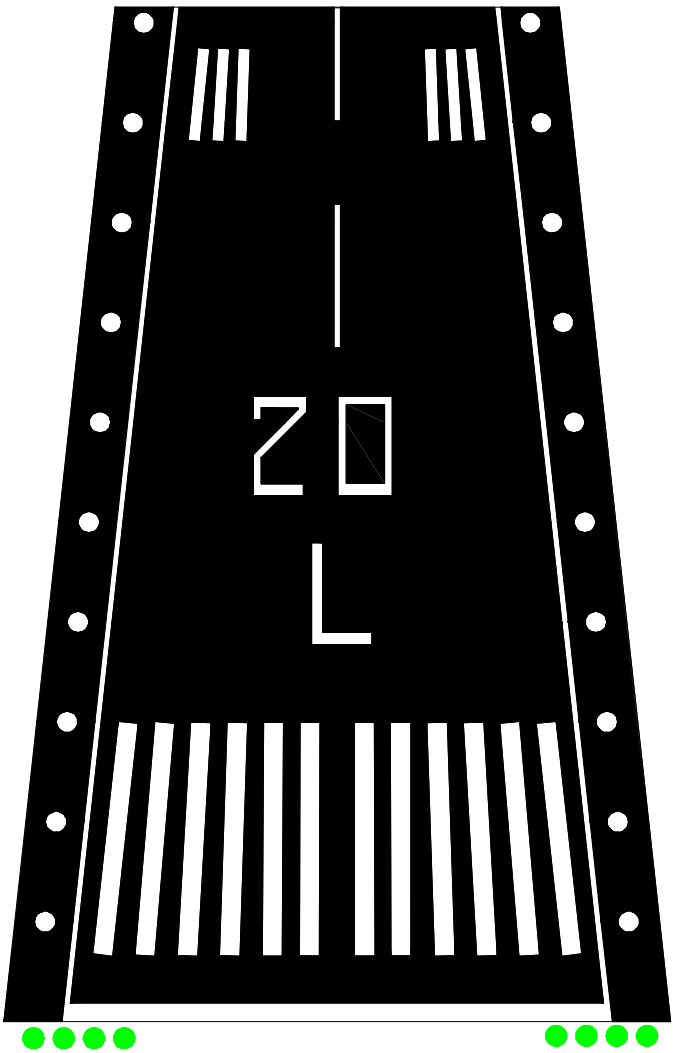
Advisory Circular

U.S. Department
of Transportation
Federal Aviation
Administration

Runway and Taxiway Edge Lighting Systems



Initiated by: *AAS-200*

U.S. Department
of Transportation
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Advisory Circular

Subject:	RUNWAY AND TAXIWAY EDGE LIGHTING SYSTEMS	**Date:**	DRAFT	**AC No.:**	150/5340-24A
		Initiated by:	AAS-200	**Change:**	

1. PURPOSE. This advisory circular (AC) describes standards for the design, and installation of runway and taxiway edge lighting systems.

2. CANCELLATION. The following documents are cancelled:

a. AC 150/5340-24, *Runway and Taxiway Edge Lighting System*, dated September 3, 1975.

b. Engineering Brief No. 58, *Lighting and Signage of Declared Distance Runways*; dated December 20, 1999.

3. PRINCIPLE CHANGES. Principle changes included in this revision are as follows:

a. Addition of a spacing tolerance for threshold lights.

b. Addition of edge lighting standards for runways where declared distance concepts are applied.

c. Addition of spacing criteria for taxiway edge lights.

d. Prohibition of the use of in-pavement runway edge lights for the full length of the runway.

e. Requirement to couple the controls if two circuits are used to power edge lights on the same runway.

f. Warning that the potential for excessive electromagnetic interference exists.

g. Addition of a requirement to remotely monitor runway edge lights.

h. Addition of detailed installation methods for light bases.

i. Deletion of the option to install entrance-exit lights in lieu of guidance signs.

j. Updates of drawings.

4. APPLICATION. The standards and guidance contained herein are recommended by the Federal Aviation Administration (FAA) for all applications involving airport development of this nature. The use of these standards is mandatory for those projects receiving funds under the Airport Grant Improvement Program or the Passenger Facility Charge Program.

5. EFFECTIVE DATE. The standards contained herein are effective for all new construction as of the issue date of this AC.

6. METRIC UNITS. To promote an orderly transition to metric units, this AC contains both English and metric dimensions. The metric conversions may not be exact metric equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

7. COMMENTS. Comments or suggestions for improvements to this AC should be sent to :

Manager, Engineering and Specifications Division
Federal Aviation Administration
Attn: AAS-200
800 Independence Ave. S.W.
Washington, DC 20591

8. COPIES OF THIS AC. The FAA, Office of Airport Safety and Standards makes copies of ACs in their purview available to the public through the Internet at http://www.faa.gov. To get to the AC area, select "FAA Organizations" then "Airports" followed by "Advisory Circulars." A printed copy of this and other ACs may be ordered through the AC Checklist, which is available on the Internet at http://www.faa.gov/abc/ac-chklst/actoc.htm or by mail from the:

U.S. Department of Transportation
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David L. Bennett
Director of Airport Safety and Standards

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1. INTRODUCTION. Edge lighting systems are used to outline usable operational areas of airports during periods of darkness and low visibility weather conditions. These systems are classified according to the intensity or brightness produced by the lighting system.

This AC covers standards for the design and installation of the following systems:

A. Runway Edge Lighting Systems. Runway edge lights define the edge of the runway. The following standard systems are described in this AC:

LIRL - low intensity runway lights
MIRL - medium intensity runway lights
HIRL - high intensity runway lights

B. Taxiway Edge Lighting Systems. Taxiway edge lights define the edge of the taxiway. The standard taxiway edge lighting system for airports is described in this AC:

MITL - medium intensity taxiway lights

2. SELECTION CRITERIA. The selection of a particular edge lighting system is generally based on the operational needs in accordance with the following guidelines:

LIRL - install on visual runways,
MIRL - install on visual runways or non-precision instrument runways,
HIRL - install on precision instrument runways,
MITL - install on taxiways and aprons at airports where runway lighting systems are installed.

As stated, the above is general selection criteria. However, the airport surface requirements for specific approach procedures are the determining factor for system selection. See AC 150/5300-13, *Airport Design,* Appendix 16, *New Instrument Approach Procedures*, for more information.

3. RUNWAY EDGE LIGHT CONFIGURATIONS. A runway edge lighting system is a configuration of lights which defines the lateral and longitudinal limits of the usable landing area of the runway. Two straight lines of lights installed parallel to and at equal distances from the runway centerline define the lateral limits. The longitudinal limits of the usable landing area are defined at each end of the area by straight lines of lights called threshold/runway end lights, which are installed perpendicular to the lines of runway edge lights. Table 3, *Equipment and Material*, provides information on the recommended light fixture for each application.

A. Edge Lights.

1). Colors.

a). LIRL's**.** The runway edge lights emit white light as shown in figure 2.

b). MIRL's and HIRL's**.** The runway edge lights emit white light, except in the caution zone, which is the last 2,000 feet (610 m) of runway, or one-half the runway length, whichever is less. In the caution zone, yellow lights shall be substituted for white lights. In the caution zone, the runway edge lights emit yellow light in the direction facing the instrument approach threshold and white light in the opposite direction. Instrument approach runways are runway end specific, meaning one runway may have an instrument approach on one end and a non-instrument approach on the opposite end. However, when there is an instrument approach at each runway end, yellow/white lights are installed at each runway end in the directions describe above. The yellow lights indicate caution on rollout after landing. Example is shown in figure 3.

2). Location and Spacing.

a.) General. The runway edge lights are located on a line parallel to the runway centerline at least 2 ft (0.6 m), but not more than 10 ft (3 m), from the edge of the full strength pavement designated for runway use. On runways used by jet aircraft, 10 ft (3 m) is recommended to avoid possible damage by jet blasts. On runways not used by jet aircraft, 2 ft (0.6 m) is recommended. The edge lights shall be uniformly spaced and the longitudinal spacing between light units should not exceed 200 ft (61 m). The edge lights should be symmetric about the runway centerline, such that a line between light units on opposite sides of the runway is perpendicular to the runway centerline. The threshold/runway end lights shall be used as the starting reference points for longitudinal spacing calculations during design.

b.) Intersections.

1). LIRL's/MIRL's. For runways where MIRL's or LIRL's are installed and the configuration of the runway intersection does not allow for the matching of the runway edge lights on opposite sides of the runway to be maintained, the gap between light units on the same side of the runway should not exceed 400 ft (122 m). On the side of the runway opposite the intersection, install a single elevated runway edge light unit maintaining the designed spacing as shown in figure 2. For MIRL's, If the gap between the runway edge lights units is greater than 400 ft (122 m) install a L-852D (specified in AC 150/5345-46*, Specification for Runway and Taxiway Light Fixtures*) light fixture modified to produce white light (by removing the filters) and maintain the designed spacing as shown in figure 3.

2). HIRL's. For runways approved for ILS Category III operations with HIRL's installed, at runway intersections install L-850C, Style 3 low profile semiflush light fixtures (described in AC 150/5345-46) to maintain uniform spacing. See figures 2 and 12. For other operations on runways with HIRL's the installation of a semi-flush fixture should be based on the following:

i) The availability of other visual cues at the intersection, such as guidance signs or centerline lighting;
ii) The geometric complexity of the intersection; and
iii) Would the addition of a semi-flush fixture possibly confuse ground operations?

c.) Runway Portions used as Taxiways. For runway portions used as taxiways the runway/taxiway shall have the specified runway lights with the designed spacing maintained on the dual purpose area. Taxiway edge lights are permitted to be installed on the dual purpose area, however, taxiway centerline lighting compliant with AC 150/5340-28, *Low Visibility Taxiway Lighting Systems* is preferred. In either case, the control system must not allow the taxiway lights and the runway lights to be on concurrently. The control systems shall be designed such that either the taxiway lights or the runway lights are on, but never should both runway and taxiway lights be illuminated at the same time in this dual purpose area.

B. Threshold/Runway End Lights.

1). Color.

a). Runway Thresholds. Threshold lights emit green light outward from the runway and emit red light toward the runway to mark the ends of the runway. The green lights indicate the landing threshold to landing aircraft and the red lights indicate the end of the runway to a departing aircraft. These lights are usually combined into one fixture and special lenses or filters are used to emit the desired light in the appropriate direction. The layout details for runway threshold lights are shown in figures 1 and 2.

b). Displaced Runway Thresholds**.** When the runway threshold is displaced and the displaced runway area is usable for specified operations the lights located at the end of the usable pavement emit red light. The threshold lights located at the displaced threshold emit green light outward

from the runway threshold and emit red light toward the runway to mark the runway end. An example of threshold lighting when the landing threshold is displaced from the actual runway threshold is shown in figures 6A-6J.

2). Location and Spacing.

a). General. The combination threshold and runway end lights are located on a line perpendicular to the extended runway centerline not less than 2 ft (0.6 m) and not more than 10 ft (3 m) outboard from the designated runway threshold. The lights are installed in two groups located symmetrically about the extended runway centerline. The outermost light in each group shall be located in line with the runway edge lights. The other lights in each group are located on 10 ft (3 m) centers toward the extended runway centerline. If other airport navigational equipment installed at the threshold prevents the lights from being properly spaced, each light in a group may be offset not more than 1 ft (0.3 m) in the same direction.

1). Runways with LIRL's/MIRL's. Threshold/Runway End lights installed on runways with LIRL's or MIRL's shall have not less than 3 lights in each light group as shown in figure 2.

2). Runways with HIRL's. Threshold/Runway End lights installed on runways with HIRL's shall have not less than 4 lights in each light group as shown on figure 3.

b). Displaced or Relocated Threshold. When the threshold is displaced or relocated from the end of the runway or paved area and access by aircraft to the abandoned area is required, the threshold lights are located outboard from the runway as shown in figure 3 and 4. The innermost light of each group is located in line with the line of runway edge lights, and the remaining lights are located outward, away from the runway, on 10 ft (3 m) centers on a line perpendicular to the runway centerline. When the displaced runway area is usable for specific operations (takeoff, rollout, taxiing), runway edge lights are installed to delineate the outline of this area, as shown in figure 4. For relocated thresholds where the pavement preceding the runway threshold is usable by aircraft the lighting configuration is shown in figure 4. For relocated thresholds where the abandoned pavement has been removed or is not intended for aircraft use, the threshold lights shall be installed as shown in figure 5.

c). Runways where Declared Distances are adjusted. Airport designs for constrained airports may require implementation of runway declared distance concepts to meet runway safety area (RSA), runway object free area (ROFA) or the runway protection zone (RPZ) standards contained in AC 150/5300-13. Figures 6A thru 6I show ten acceptable edge lighting configurations for declared distance runways. The criteria for selection the applicable configuration is described in AC 150/5300-13. The marking and signage for declared distance runways shall comply with the specification described in AC 150/5340-1, *Standards for Airport Markings*. For configurations not covered by this AC contact the FAA Airports Regional Office for guidance. The following is a list of the edge lighting configuration illustrated in this AC:

CONFIGURATION A - Lighting for Runway with Displaced Threshold. (Figure 6A)

CONFIGURATION B - Lighting for Runway with Displaced Threshold/End Taxiway. (Figure 6B)

CONFIGURATION C - Lighting for Runway with Displaced Threshold not Coinciding with Opposite Runway End. (Figure 6C)

CONFIGURATIION D - Lighting for Runway with Stopway. (Figure 6D)

CONFIGURATION E - Lighting for Runway with Displaced Threshold and Stopway. (Figure 6E)

CONFIGURATION F - Lighting for Runway with Displaced Threshold not Coinciding with Opposite Runway End. (Figure 6F)

CONFIGURATION G - Lighting for Runway with End Taxiway and Displaced Threshold, not Coinciding with Opposite Runway End. (Figure 6G)

CONFIGURATION H - Lighting for Runway with Opposite Runway End Not Coinciding with Threshold. (Figure 6H)

CONFIGURATIION I - Lighting for Runway with End Taxiway, Coinciding with Landing Threshold, Not Coinciding with Opposite Runway End. (Figure 6I)

CONFIGURATION J - Lighting for Runway with End Taxiway Coinciding with Opposite Runway End, Not Coinciding with Displaced Threshold. (Figure 6J)

4. TAXIWAY EDGE LIGHT CONFIGURATIONS. Taxiway edge lighting systems are configurations of lights that define the lateral limits of the taxiing path.

A. Color. The taxiway edge lights emit blue light, and edge reflectors reflect blue.

B. Location and Spacing. Fixtures in the edge lighting system are located in a line parallel to the taxiway centerline not more than 10 ft (3 m) outward from the edge of the full strength pavement. Reflectors may be installed in accordance with paragraph 4C of this AC in lieu of or to enhance taxiway edge lights. The spacing for taxiway edge lights is calculated based on the taxiway configuration. The methods of calculating taxiway edge light spacing is described below:

1). Straight Sections. The edge lights shall be spaced symmetrically using the criteria outlined in table 1, *Straight Taxiway Edge Light Spacing*. Lights installed on opposite sides of a straight taxiway are aligned such that opposing lights are in a line perpendicular with the taxiway centerline. Examples of taxiway lighting for straight taxiway section are shown in figures 7 and 8.

Table 1. Straight Taxiway Edge Light Spacing

Section Length (L)	Number, Edge Lights (N) (per side)[1]	Maximum Spacing (Max)	Spacing (S)
L < 50 ft	2	50 ft	L
50 ft < L < 100 ft	3	50 ft	L/2
100 ft < L < 200 ft	3 [(L/max) + 1][2] [3]	100 ft 50 ft (single edges) [3]	L/2 L/(N-1) [3]
L > 200 ft	[(L/max) + 1][2]	100 ft (single edges)[3] 200 ft	L/(N-1)

1 Number (N) excludes lights required for end and entrance/exit indicators.
2 Round value up to the next whole number, i.e. 1.31 becomes 2.
3 Applies to Single Straight taxiway edges only.

2). Curved Sections. Curved taxiway edges require shorter spacing of edge lights. The spacing is determined based on the radius of the curve. The applicable spacing for curves is shown in figure 9. The taxiway edge lights shall be uniformly spaced. Curved edges of more the 30 degrees for point of tangency (PT) of the taxiway section to PT of the intersecting surface shall have at least three edge lights. For radii not listed in figure 9 determine spacing by linear interpolation. Taxiway spacing on

curved section at general aviation airports may be reduced as shown in figure 13. In such cases, like curves on an airport shall have the same spacing.

3). Intersections. Install end indicators on straight taxiway sections 200 ft (61 m) or longer. End indicators are additional taxiway edge lights installed before the intersection spaced 50 ft (15 m) from the last light on straight taxiway sections. These lights are installed on sections of taxiways that are more than 200 ft (61 m) long, where edge light spacing exceeds 60 ft (18 m). Figures 10 and 11 show typical placement of end indicators.

C. Use of Reflectors. Reflectors are permitted to enhance taxiway lighting systems installed on short taxiway sections, curves and intersections. In such case, lights are installed to meet the spacing requirements and reflectors are installed uniformly between the lights. Reflectors are also permitted in lieu of edge lights. In such case, reflectors shall be installed using the required spacing for taxiway edge lights as specified in the AC. Specified reflectors are described in AC 150/5345-39, *FAA Specification L-853, Runway and Taxiway Centerline Retroreflective Markers*.

6. SYSTEM DESIGN. Coordinate the lighting system design with the existing and future airport plans. Airport drawings will show existing system(s) layout and available utilities. Install the conduits and ducts needed for the lighting system prior to paving operations, to eliminate the expense of installing these utilities in existing pavement. Airport drainage systems may influence the location of cable ducts and trenches. Develop design drawings showing the dimensional layout of the lighting system prior to construction. Examples of system layouts are shown in figures 12 and 13, for high density traffic airports and general aviation airports respectively.

A. Lighting Fixtures. The lighting fixtures installed in the edge lighting systems are either base mounted or stake mounted. Base mounts are used for either elevated fixtures or in-pavement fixtures. Inpavement fixtures are not permitted for the full length of the runway, they are typically used in areas where aircraft may roll over the fixture. Stake mounting is typically less expensive than base mounting; however, base mounting provides additional protection for this equipment and makes the equipment more accessible for maintenance. Stake mounting requires the transformers, cables and connectors be buried in the earth. A typical drawing of fixture mountings are shown on figure 23. Base mounted fixtures shall be installed using series circuits only and are recommended for HIRL, MIRL, or MITL. Stake mounted fixtures can be installed with either series or parallel circuits and are recommended for HIRL, MIRL, LIRL, or MITL. Details of mounting methods are covered in paragraph 8 of this AC.

B. Electrical Power (Series vs. Parallel Circuits). Series powered circuits are recommended for the HIRL, MIRL, and MITL. The advantages of the series circuits are 1) uniform lamp brightness, and 2) lower installation cost for long runways, generally over 4,000 ft long. Parallel power circuits are recommended for MIRL, LIRL, and MITL. Parallel circuits have a lower installation cost for short runways, 4,000 ft or less. If two or more circuits are used to power the edge lights for one runway and loss of power to any of those circuits will leave more the 400 ft of the runway without edge lights, the two circuits should be coupled such that if one is energized both are energized, or if one is de-energized both are de-energized.

C. Power Source and Monitoring. Series powered airport lighting circuits are powered by constant current regulators (CCR). The regulators and the associated monitoring system are described in AC 150/5345-10, *Specification for Constant Current Regulator and Regulator Monitors*. The CCR's are designed to provide the desired number of brightness steps. Some regulator designs emit electromagnetic interference (EMI) that may degrade the performance of other air navigational equipment,

Table 2. Edge Lighting System Design Guide

Lighting System	Installation		Fixture	Power System	Number of Steps	Associated Threshold	
	Type	Mounting				Design	Fixtures
RUNWAY EDGE LIGHTING							
HIRL	Inset[1]	Base	L-850C	Series	5	8 lights	L-862
	Elevated	Base or Stake	L-862				
MIRL	Inset[1]	Base		Series	3	8 lights	L-861 SE L-861 E
	Elevated	Base or Stake	L-861	Series or Parallel			
LIRL	Elevated	Base or Stake	L-860	Series or Parallel	1	6 lights	L-860 E
TAXIWAY EDGE LIGHTING							
MITL	Inset	Base	L-852T	Series	3		
	Elevated	Base or Stake	L-861T	Parallel	1		

1 Inset fixtures are not permitted for the full length of the runway, they are typically installed in areas where aircraft may roll over the fixture.

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such as computers, radars, instrument landing systems, radio receivers, very high frequency omnidirectional radio ranges, etc. See Appendix III, *Airport Technical Advisory* for more information. Runway edge lighting systems that support CAT II or CAT III operations should be remotely monitored and shall provide the monitoring information to the Airport Traffic Control Tower. The monitoring systems should be capable of detecting when more than 10 percent of the lights are inoperative.

D. Brightness Steps. The brightness of the lamps is specified in steps that are defined as a percentage of the full brightness of the lamp. (AC 150/5345-46, *Specification for Runway and Taxiway Light Fixtures* contains the specifications for the light fixtures). The following tables specify the appropriate lamp current or voltage to achieve each brightness step.

1). High Intensity Systems. The HIRL's, have five brightness steps as follows:

	Percent Brightness	Lamp Current
Step 5	100	6.6 A
Step 4	25	5.2 A
Step 3	5	4.1 A
Step 2	1.2	3.4 A
Step 1	0.15	2.8 A

2). Medium Intensity Systems. The MIRL's and MITL's, when installed using a series circuit and powered by an L-811 or L-812 regulator, have three brightness steps as follows:

	Percent Brightness	Lamp Current	
		Series	Parallel
Step 3	100	6.6 A	120 V
Step 2	30	5.5 A	85 V
Step 1	10	4.8 A	60 V

When MITL's are installed using a parallel circuit, only one brightness step is required, although it may be desirable to provide equivalent brightness steps as obtained with the series circuit. This may be accomplished by use of a variac, auto-transformer, or other means.

3). Low Intensity Systems. The LIRL's have only one brightness step.

E. Control Methods. The edge lighting systems should have provision for local and/or remote controls methods. Remote controls are recommended for locations served by a control tower, flight service station, or other manned offices where the system(s) operates.

1). Local Control. Local controls may be designed using direct switching at the site or automatic controls such as a photoelectric control device or timer switch with provisions for switching from automatic to manual control.

2). Remote Control. Remote controls may be designed using land lines or radio control with L-854 equipment as specified in AC 150/5345-49, *Radio Control Equipment*. Figures 17 thru 21 show some typical applications for remote controls.

a). 120 Volts AC. Where the distance between the remote control panel and the vault is not great enough to cause an excessive voltage drop in the control leads, the standard control panel switches to operate the control relays directly should be used. Operating relays supplying power to the regulators must have coils rated for 120 volts AC. A No. 12 AWG control cable should be used to connect the control panel to the power supply equipment in the vault. Use the curves in Figure 16A and 16B to determine the maximum permissible separation between the control panel and the vault for 120 volt AC control.

b). 120 Volts AC - Auxiliary Relay. Special low-burden pilot auxiliary relays, having proper coil resistance to reduce control current, may be used to obtain additional separation distance with 120 volt AC control circuits. It may be advantageous to use these relays to expand existing 120 volt AC control circuits. Figures 17, 18 and 19 illustrate typical applications of 120 volt AC control circuits.

c). 48 Volts DC. Where the distance between control panel and the vault would cause an excessive voltage drop a low voltage (48 volt DC) control system should be used. In such a system, remote control panel switches activate sensitive pilot relays, such as those specified in AC 150/5345-13, *Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits*, which, in turn, control the regulator relays. Use an appropriately sized cable, of a type suitable for direct earth burial, to connect the control panel to the pilot relays. The DC control system is adequate for up to 7900 feet separation between control point and vault. For typical application details, see Figures 20 and 21 and AC 150/5345-3, *Specification for L-821 Panels for Remote Control of Airport Lighting*.

F. Runway Visual Range (RVR) Connections. Where runway visual range (RVR) equipment is to be installed, provide two No. 12 AWG wires for 120-volt control, or two No. 19 wires if 48-volt control is used, between the control tower and the vault. Tape or seal the ends of the wires until connections are made to prevent moisture damage. The wires in the vault connect to an interface unit provided with the RVR equipment. The wires in the tower connect to RVR equipment. All RVR connections shall be in accordance with instructions provided with the RVR system and made by personnel responsible for the RVR or their designee.

7. EQUIPMENT AND MATERIALS. Equipment and material covered by FAA advisory circulars are referred to by item numbers and the associated AC numbers where the equipment is specified. All pertinent ACs and specifications are referenced by number and title in Appendix I, *Related Reading Materials.* Equipment not covered by FAA specifications, such as distribution transformers, circuit breakers, cutouts, relays, and other commercial items of electrical equipment, must conform to the applicable rulings and standards of the electrical industry and local code regulations. Electrical equipment should be tested and certified by an Occupational Safety and Health Administration (OSHA) recognized Nationally Recognized Testing Laboratory (NRTL) and should bear that mark. A current list of NRTLs can

Table 3. Equipment and Materials

Item Description	Item No.	Advisory Circulars or Specifications
Auxiliary Relay Cabinet	L-841	AC 150/5345-13
Cable	L-824	AC 150/5345-7
Cable Connectors	L-823 series circuits L-108 parallel circuits	AC 150/5345-26 AC 150/5370-10 (para. 108-2.4)
Circuit Selector Switch	L-847	AC 150/5345-5
Control Panel	L-821	AC 150/5345-3
Elevated Edge Light Fixture (HIRL)	L-862, L-850 C_1	AC 150/5345-46
Elevated Edge Light Fixture (LIRL)	L-860	AC 150/5345-46
Elevated Edge Light Fixture (MIRL)	L-861	AC 150/5345-46
Elevated Threshold Light Fixture (HIRL)	L-862	AC 150/5345-46
Elevated Threshold Light Fixture (MITL)	L-861 SE, L861 E $_2$	AC 150/5345-46
In-pavement Semiflush Light Fixture	L-852	AC 150/5345-46
In-pavement Semiflush Light Fixture	L-850 C, D, E	AC 150/5345-46
Isolation Transformers	L-830	AC 150/5345-47
Junction Box	L-869	AC 150/5345-42
Light Base and Transformer Housing $_3$	L-867, L-868	AC 150/5345-42
Regulators	L-828	AC 150/5345-10
Retroreflective Markers	L-853	AC 150/5345-39
Duct and Conduit	L-110	AC 150/5370-10
Concrete	P-610	AC 150/5370-10
Tape	L-108	AC 150/5370-10
Vaults	L-109	AC 150/5370-10

1 Install the L-850 C light fixture if semiflush fixtures are applicable per paragraph 3.A.2.b.2.
2 For runways with either a visual approach slope indicator (VASI), runway end identifier lights (REIL), medium approach light system (MALS), or lead-in lighting system (LDIN), L-861E light fixture may be installed in lieu of the L-861SE.
3 Elevated lights are installed with a 12-inch (Size B) base and in-pavement light fixtures are installed with a 15-inch (Size C) base.

be obtained by contacting the OSHA NRTL Program Coordinator at 202-219-7193. Table 3, *Equipment and Materials*, contains a list of equipment and material used for runway and taxiway edge lighting systems described in this AC.

A. *Vault*. The vault should be of the type shown on the design plans. Construction should be reinforced concrete, concrete masonry, brick wall, or prefabricated steel, as specified. All regularly used commercial items of equipment used such as distribution transformers, oil switches, cutouts, etc. which are not covered by FAA specifications shall conform to the applicable standards of the electrical industry.

B. *Light Base and Transformer Housing*. Use a base and transformer housing conforming to AC 150/5345-42, *Specification for Airport Light Bases, Transformer Houses, Junction Boxes and Accessories*. If the secondary wires are fed to the in-pavement lights through a saw kerf, a one-inch hub should be welded to the base at 90 degrees from the two existing two-inch hubs, which are 180 degrees apart. A gasket and suitable coverage also required for off-taxiway installation. Local conditions may require other modifications to the bases.

C. *Preinsulated Connectors*. When splicing the fixture leads to the No. 10 AWG THWN wires, use preinsulated connectors suitable for installation in the wireways.

D. *Auxiliary Relays*. Where required, use a hermetically sealed relay having a single pole double throw (SPDT) contact arrangement rated for 5 amperes at 120 volts AC and a coil resistance of 5000 ohms in a 120 volt AC control circuit. Relay connections may be either solder terminals or plug-in.

E. *Optional Sealer Material*. Other types of sealers material that provide satisfactory adhesive and waterproofing qualities may be used in lieu of sealer materials P-605 and P-606, upon approval of the engineer in charge. Sealer to be used in asphalt must be compatible with asphalt. The specifications for the P-605 and P-606 sealers are described in AC 150/5370-10, *Standards for Specifying Construction of Airports*.

8. INSTALLATION. This section recommends installation methods and techniques; however, other methods and techniques, and variation of those outlined here, may be used provided they are approved by the appropriate local FAA Airports Office. The installation should conform to the applicable sections of the National Electrical Code and any local codes which apply to a particular installation. The light fixtures are supplied unassembled and consist of an optical system, lamp, connecting leads, and a mounting assembly. The installer will assemble, connect to mounting, level, and adjust the light fixture in accordance with the manufacturer's instructions. Care should be taken that the lamp specified by the manufacturer for the particular use of the light fixture is installed. The light fixtures shall be level. Where appropriate, the fixture shall be aligned within 1 degree. The standard height of the top of the elevated light fixture is 14 inches (35 cm) above the finished grade. In areas where the mean annual total snowfall exceeds 2 feet (0.6 m), this standard elevation may be increased as illustrated in figure 22.

A. Base Mounted Fixtures . This type of installation is normally used only with series circuits to house the isolation transformer and to accommodate a closed duct system. Prior to mounting the light fixture on the base, an L-823 connector kit is installed on the primary power cable ends and the appropriate L-830 isolation transformer is installed. These transformers serve as a means for isolating the light unit from the high voltage primary of the series circuit. Wrap the connector joints in the primary circuit with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1½ inches (3.8 cm) on each side of the joint. During base installations make sure the cable entrance hubs are oriented in the proper direction. Base and conduit systems are subject to water intrusion. Consider base elevations, base heights, conduit slopes, drain holes, and other provisions to facilitate removal of water from the base and conduit. Typical fixture and duct details are shown in figures 23 and 24, respectively. Plug the light disconnecting plug into the transformer secondary receptacle. Do not tape this connection. The typical methods for installing light bases in various types of surfaces are described in this section.

1). New Rigid Pavement. This system is preferred but requires careful attention to detail during installation. One of two conditions will be encountered during installation: the edge of existing pavement will be available as a reference for the new bases, or an existing edge will not be available and the bases must be set "in space." The availability of an existing pavement edge simplifies the task of locating the light base. In both cases, a jig or fixture is required to hold the base in position while the concrete anchor is placed. Azimuth and the elevation of the base with respect to the pavement surface are two parameters that must be met. It is absolutely necessary that the elevation of the flange be at least ¾ inch (19 mm) below the pavement finished surface. If less than ¾ inch (19 mm) is left after paving, the light fixture will be unacceptably high. If more than ¾ inch (19 mm) is left, spacer rings can be used to bring the light fixtures up to the correct elevation. Allow for paving tolerances of ±1/2 inch (13 mm) when setting the elevation of the fixture. At each light location, make an excavation in the pavement base which is large enough to accommodate the specified light base, the reinforcing steel cage, and concrete for the anchor. After the excavation is completed, the light base and reinforcing steel cage are installed and held in place with the jig, see Figure 25. The jig will establish the elevation and azimuth of the base and maintain this position until the concrete anchor is placed. A recommended practice is to connect each base to the conduit system with a length of liquid-tight flexible conduit as in Figure 27. Flexible conduit will allow adjustments in light base alignment before the concrete anchor is placed. Care must be taken while placing the concrete anchor that neither the jig nor the light base alignment is disturbed. The jig must remain in place until the concrete has set. During paving

operations the light base may be fitted with a steel cover (mudplate), see Figure 25. After the paving train has cleared the light base, remove excess concrete from the top of the base, and finish the edge of the opening around the base to a smooth radius. The surface of the pavement around the light base must be level with the surrounding pavement; dished and mounded areas are not acceptable. After the pavement has hardened, check the elevation of the top flange in relation to the finished surface. It may be necessary to install a flange ring, or flange and spacer ring, to bring the light fixture to correct elevation. Next, install the primary cable, transformers, and connectors. Connect the light fixture to the secondary cable. Install an "O" ring gasket and torque holddown bolts to manufacturer's recommendations.

NOTE: **Alternate Procedure for Installation of Sectional Bases**. If the paving technique utilizes more than one "pass" of the paving machine, the above procedure is altered as follows; a sectional light base is required and, after the bottom section has been installed as described above, the first pass is completed. The flange is then cleaned and the next section is installed with a sealant equal to RTV-118 between flanges, and torqued in place. The paving proceeds, and the fixture is installed as above.

2). New Flexible Pavement. A sectional base is required for flexible pavement. The bottom section of the light base (including concrete anchor) and the conduit system is installed in the pavement base as described in the preceding paragraph.

NOTE: Because of the loads placed on the cover plate during paving, a plywood cover should be a minimum of 5/8-inch (16 mm) thick. If the top section will not be installed right away, a mudplate (1/8 inch (3 mm) galvanized steel cover) should be used. It is then paved over. The light base, concrete anchor, and conduit backfill must not be higher than the base surface. After the paving is completed, a 2-inch (50 mm) hole is bored to accurately locate the center punch mark of the bottom section cover plate. This hole is used to measure the actual distance from the pavement surface to the top of the cover or mudplate. A top section should be obtained, with a height that will accommodate the fixture and flange ring, and spacer ring if necessary. When the top section is received, a hole 1 inch (25 mm) larger than the diameter of the fixture should be drilled and the top section, flange ring, light fixture, and any spacer rings installed as described above. The space between the walls of the hole up to the top of the top section should be filled with liquid P-606 sealant which is compatible with asphalt. After the P-606 has cured, the remaining space should be filled with P-605, Type III sealant (which is compatible with asphalt) up to the top of the mud dam, if installed, or otherwise up to the top of the flange ring. See Figure 27 for details.

3). Flexible Overlay. The installation of a light base and conduit system in a pavement to be overlaid is similar to that of a new flexible pavement installation, except the bottom section of the light base and the conduit are set in openings made in the existing pavement. The required concrete anchor and encasement of the conduit will be similar to that described in paragraph 8.A.2 (New Flexible Pavement). The use of a short length of liquid-tight flexible conduit is necessary to allow proper alignment. The remainder of the installation is as described in the preceding paragraph.

4). Rigid Overlay. The installation of a light base and conduit system requires a combination of techniques outlined in paragraphs 8.A.1 (*New Rigid Pavement*) and 8.A.3 (*Flexible Overlay*). The base and conduit are installed as in paragraph 8.A.3 (*Flexible Overlay*); concrete is placed as in paragraph 8.A.1 (*New Ridged Pavement*).

B. Direct-Mounting. While the installation of direct-mounted fixtures is becoming less common, there are instances where they are still applicable, e.g. overlays. However, they are not recommended for flexible pavement in very cold climates.

1). Rigid Pavement. Drill holes or recesses in the pavement to accommodate the light fixtures. Saw wireways to accommodate electrical circuits. See Figure 28.

a). Pavement Drilling and Sawing**.** Provide approximately ¼-inch (6 mm) clearance for sealer material between the bottom and sides of the inset base receptacle and the recess. Provide extra depth where sawed wireways cross pavement joints. See Figure 28 for detail.

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i) Prior to placing the inset base receptacle in the drilled hole, clean all external surfaces to assure an adequate bond between fixture, sealer, and pavement. Sandblast if necessary. Avoid handling the fixtures by the leads.

ii) Orient the fixture and arrange the leads properly with respect to their splicing position in the wireway. Use temporary dams, if required, for blocking the wireway entrance into the drilled hole. The dams will retain the sealer during the setting of the inset base receptacle. The orientation tolerance for the base is ±1 degree. Rugged, well-designed jigs are required to assure proper azimuth, elevation, and level.

iii) Cover the bottom of the inset base receptacle with a paste-type adhesive material. Place a sufficient quantity of paste in the drilled hole. Place the base in the drilled hole to force adhesive up the sides of the base at least 1/8 inch (3 mm). Take care to work out entrapped air. Use a liquid sealer (paragraph 7e) to fill the space between the base and the sides of the hole. Liquid sealer should be applied only between the inset base receptacle and the sides of the hole, and should not be applied between the sides of the hole and the top assembly.

b). Wireways**.** Prior to the installation of the wires in the pavement, chamfer or round to 2-inch (50 mm) radius the vertical edges of the wireways at intersections and corners. See Figure 28. Sandblast and clean wireways to insure a proper bond between pavement material and the sealer. If wireways have been wet-sawed, flush these wireways with a high velocity stream of water immediately after sawing. Prior to installation of the sealer, the wireways must be dry and clean.

c). Wires**.** Place the #10 AWG THWN wires in the wireways from the transformers near the taxiway edge to the light fixture leads. An adequate number of wedges, clips, or similar devices should be used to hold the wires in place at least ½ inch (13 mm) below the pavement surface. The spacing between wedges, clips, etc., should not exceed 3 feet (0.9 m). Wood wedges and plugs are not acceptable. Install the top of the wedges below the pavement surface. Splice the light fixture leads to the #10 AWG wires. Use pre-insulated connectors. Make the crimped splice with a tool that requires a complete crimp before releasing. Stagger the location of the splices. Permit no splices in the single conductor wires except at each fixture or L-869 junction box. If the installation is made in stages, tape or seal the ends of exposed wires to prevent the entrance of moisture. Seal the wires in the wireways with Item P-606 material. Apply in accordance with AC 150/5370-10 and the following steps:

i) Pour sealer in wireway until surface of wire is covered.

ii) If recommended by the manufacturer, pour clean sand into the liquid sealer until a slight amount of sand shows on the surface. Use clean sand that can pass through a Number 40 sieve.

iii) Fill the remainder of the wireway with liquid sealer to between 1/8 inch (3 mm) and ¼ inch (6 mm) below the pavement surface.

2). Flexible Pavement. Install direct-mounted light fixtures and wires in flexible pavement in a manner similar to the installation procedures for rigid pavements (paragraph 8.B.1) with the following precautions:

a). Clean the holes and wireways immediately before installation so that the clean, dry aggregate of the pavement is exposed.

b). Use sealant which is compatible with asphalt.

c). Mix the P-606 sealant (for use on fixtures) so that it sets up within 15 minutes.

d). Use sealant that conforms to P-606 to seal wires in wireways.

e). Junction boxes may be installed on runways where overlays are anticipated. When additional pavement is required, the inset light is removed and the base is fitted with a cover. Paving is then applied over the light base and junction box. When the paving is completed, expose the junction box and light base by coring. Remove covers. Proceed as described in Paragraph 8.A.2 (*New Flexible Pavement*).

C. Stake Mounted Fixtures. For series circuits, make connections and transformer installation as detailed in the paragraph 8.A. (*Base Mounted Fixtures*). Bury the transformer primary cable connectors at least 10 inches (25 cm) deep and adjacent to the stake as shown in Figure 23. Burying the components in like locations at each stake, maintenance of the underground system is facilitated. When installed in a location where the frost line depth exceeds the minimum cable installation depth, as specified in AC 150/5370-10, Item L-108, increase to a maximum of 2 ft (0.6 m) in depth the installation of the cable, transformers, and connectors. Do not attach cable connectors to the stakes. Install primary cable connectors, splices, and transformers at the same depth and in the same horizontal plane as the primary cable with adequate slack provided. The radius of cable bends should not be less than 10 inches (25 cm). Place the secondary leads from the transformer to the lamp socket in a loose spiral with excess slack at the bottom. Install the stake in a 6-inch (15 cm) diameter hole at a depth of 30 inches (76 cm) as shown in Figure 23. Do not install stake by driving. Make electrical connections and backfill around the stake with thoroughly compacted earth passing a 1-inch (2.54 cm) sieve. Where required due to unstable soil conditions, backfill with concrete. Install the top of the stake even with, or not more than ½ inch (1.3 cm) above the finished grade and maintain within 1 degree of the vertical. In areas where frost may cause heaving, anchor the stake with concrete and use a permeable backfill material such as sand around the buried electrical components and then cover the top surface with an impervious material to reduce moisture penetration.

D. Vault.

1). Install the airport vault and equuipment in accordance with AC 150/5370-10, Item L-109, *Installation of Airport Transformer Vault and Vault Equipment*.

2). Exercise care while in the vault to prevent drill deposits, iron filling, insulation stripping or other foreign matter deposits from collecting on relays, switches, and other operating components. Collect and remove all residue after the installation to protect wiring and components from foreign matter.

E. Cable Installation. Primary cables and control cable may be direct buried or installed in cable duct or conduit. Although both methods are acceptable it is preferable to install cables in duct or conduit where possible. Cables installed in ducts and conduits shall conform to Item L-108, *Installation of Underground Cable for Airports*, paragraph 3.2 of AC 150/5370-10. Install the duct and/or conduit conforming to the requirements of Item L-110, *Installation of Airport Underground Electrical Duct*, paragraph 3 of AC 150/5370-10. Designers and contractors installing airport lighting systems should pay careful attention to Electromagnetic interference (EMI) levels on the airport. EMI that degrades the performance of other air navigational equipment, such as computers, radars, instrument landing systems, radio receivers, very high frequency omnidirectional radio ranges, etc may be unacceptable to the sponsor and/or the FAA. See Appendix III, *Airport Technical Advisory* for more information.

1). Primary Cable Installation. Install primary cable in a trench from the regulator into a light base in the field. Provide at least 2 ft of slack cable in each light base to permit connections of primary cable and the isolation transformer primary leads to be made above ground. Seal the cable entrance of the light base with squeeze connectors where specified. These squeeze connectors are provided with a rubber bushing of the correct size to fit the outside diameter of the cable. Tighten the

squeeze connectors to provide a watertight seal without deforming the insulation and jacket of the cable. Tape the cable ends during construction to prevent the entrance of moisture. Trenching, installation of cable, backfilling trenches, and the installation of cable markers should conform to Item L-108, *Installation of Underground Cable for Airports* of AC 150/5370-10. Figure 24 shows details of connections.

2). Primary Cable Connections. Make splices on primary underground cables to conform to Item L-108, *Installation of Underground Cable for Airports*, paragraph 3.8 of AC 150/5370-10. No splices are to be in ducts, conduits, or in circuits between light fixtures unless housed in an approved manhole, handhole, or light base/transformer housing. Where crimp connectors or field attached plug-in connectors conforming to AC 150/5345-26, *Specification for L-823 Plug and Receptacle, Cable Connectors*, are employed, use crimping tools of the type that must be fully closed before they can be released and that are designed for the specific type connector to assure crimps or detents meeting the necessary tensile strength. Wrap the connector joints in the primary circuit with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extended at least 1-1/2 inches (38 mm) on each side of the joint. "Heat shrink" material may be used to seal cable connections.

3). Secondary Lead Connections. Make connections to the secondary isolation transformer leads and the No. 10 AWG wires with a disconnecting plug and receptacle conforming to AC 150/5345-26. Attach the L-823, Class B, Type II, Style 4 plug on the end of the two No. 10 AWG wires using a crimping tool designed for the connector to assure a crimp or indent meets the necessary tensile strength. Insert this connector into the transformer secondary receptacle. See Figure 28 for typical secondary wiring details.

4). Installing Duct or Conduit Under Paved Surfaces. Provide a reasonable number of spare ducts or conduits in each bank for maintenance and future expansion of facilities. Avoid routing ducts or conduits through areas which may have to be excavated. Where ducts are in tiers, use the lowest ducts to receive cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and interferences are avoided.

5). Counterpoise. If required, install counterpoise wire for lightning protection in the same trench 4 inches (10 cm) above the insulated cable it is to protect as specified in Item L-108, *Installation of Underground Cable for Airports*, paragraph 3.9 of AC 150-5370-10.

F. Identification Numbers. In order to facilitate maintenance of the light fixtures, identification numbers are assigned to each transformer housing. Place the numbers by one of the following methods.

1). Stenciling. Stencil numbers with black paint on the runway side of the base plate. The minimum height of the numbers is 2 inches (5 cm).

2). Metal Disc. Attach a noncorrosive disc with permanently stamped or cut out numbers under the head of the transformer housing base plate bolt of the fixture. The minimum height of the numbers is 2 inches (5 cm).

3). Paint. Impress numbers on a visible portion of the concrete backfill. The minimum height of the numbers is 3 inches (7.6 cm).

G. Duct and Cable Markers. Mark all locations of the ends of ducts and all direct earth burial cable with a concrete marker slab in accordance with Items L-108 and L-110 of AC 150/5370-10. See Figure 24 for duct and cable marker details.

9. INSPECTION. Inspect the installed lighting system as indicated below.

A. Inspect each light fixture to determine that it is installed correctly at the proper height, in line with the other fixtures, level, and properly oriented.

B. Check any light fixtures with asymmetrical lenses to determine that they are properly oriented with respect to the runway longitudinal sides and the threshold. Check all lights for alignment.

C. Check identification numbers for each light unit to determine that the number at the installation is as assigned in the plans.

D. Check equipment covered by FAA specifications to determine if the manufacturers have supplied certified equipment. Also check the equipment for general conformance with specification requirements.

E. Inspect all cables, wiring, and splices to obtain assurance that the installation is in accordance with AC 150/5370-10, the National Electrical Code, and local codes. Inspect and test insulation resistance of underground cables before backfilling.

F. Check all ducts and duct markers to determine that the installation is in accordance with AC 150/5370-10. Inspect underground ducts before backfill is made.

G. Check the input voltage at the power and control circuits to determine that the voltage is within limits required for proper equipment operation. Select the proper voltage tap on equipment where taps are provided.

H. Check fuses and circuit breakers to determine if they are of the proper rating.

I. Check base plates for damage during installation and refinish according to manufacturer's instructions.

J. Check the current or voltage at the lamps to determine if the regulator current or supply voltage is within specified tolerance. If a current or voltage exceeds rated values the lamp life will be reduced.

10. TESTING. The Contractor shall furnish all necessary equipment and appliances for testing the underground cable circuits after installation. The Contractor shall test and demonstrate to the satisfaction of the Engineer the following:

A. That all lighting power and control circuits are continuous and free from short circuits.

B. That all circuits are free from unspecified grounds.

C. That the insulation resistance to ground of all non-grounded series circuits is not less than 50 megohms.

D. That the insulation resistance to ground of all non-grounded conductors of multiple circuits is not less than 50 megohms.

E. That all circuits are properly connected in accordance with applicable wiring diagrams.

F. That all circuits are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operations of each lighting and power circuits for not less than ½ hour.

11. MAINTENANCE. Maintenance of the edge lighting systems should be performed according to the requirements contained in AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*.

APPENDIX I
Related Reading Material

Number	Title
AC 150/5340-1	*Standards for Airport Markings*
AC 150/5340-14	*Economy Approach Lighting Aids*
AC 150/5340-17	*Standby Power for Non-FAA Lighting Systems*
AC 150/5345-3	*Specification for L-821 Panels for Remote Control of Airport Lighting*
AC 150/5345-5	*Circuit Selector Switch*
AC 150/5345-7	*Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits*
AC 150/5345-10	*Specification for Constant Current Regulators Regulator Monitor*
AC 150/5345-13	*Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits*
AC 150/5345-26	*Specification for L-823 Plug and Receptacle, Cable Connectors*
AC 150/5345-39	*FAA Specification L-853, Runway and Taxiway Centerline Retroreflective Markers*
AC 150/5345-42	*Specification for Airport Light Bases, Transformer Houses, Junction Boxes and Accessories*
AC 150/5345-46	*Specification for Runway and Taxiway Light Fixtures*
AC 150/5345-47	*Isolation Transformers for Airport Lighting Systems*
AC 150/5345-53	*Airport Lighting Equipment Certification Program*
AC 150/5370-10	*Standards for Specifying Construction of Airports*

This AC, the above list of ACs and the latest list of certified equipment are available on the internet at the FAA Office of Airports (ARP) home page at: www.faa.gov/arp/arphome.htm on the internet.

APPENDIX II
Terms

a. Declared Distances. The distances declared available and suitable for satisfying the airplane takeoff run, takeoff distance, accelerate-stop distances, and landing distance requirements. The distances are:

Accelerated-stop distance available (ASDA). The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.
Landing Distance Available (LDA). The runway length declared available and suitable for a landing aircraft.
Takeoff runway available (TORA). The runway length declared available and suitable for the ground run of an airplane taking off;
Takeoff distance available (TODA). The TORA plus the length of any remaining runway and/or clearway beyond the far end of the TORA.

b. Displaced Threshold. A threshold that is located at a point on the runway other than the designated beginning of the runway.

c. Non-precision Instrument Runway. A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance for which a straight-in or side-step non-precision approach procedure has been approved.

d. Precision Instrument Runway. A runway having an existing instrument approach procedure utilizing air navigation facilities with both horizontal and vertical guidance for which a precision approach procedure has been approved.

e. Runway Object Free Area (ROFA). An area on the ground centered on a runway provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

f. Runway Protection Zone. An area off the runway end used to enhance the protection of people and property on the ground.

g. Runway Safety Area (RSA). A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

h. Threshold. A line perpendicular to the runway centerline marking the beginning of the runway surface available for a landing.

i. Visual Runway. A runway having no straight-in instrument approach procedure.

APPENDIX III
Airport Technical Advisory

Subject: Electromagnetic Interference (EMI) induced by L-828, Silicon Controlled Rectifier (SCR) Type, Constant Current Regulators (CCR's)

Some airports have experienced excessive levels of electromagnetic interference (EMI) which degrade the performance of some of the airport's air navigational systems, i.e. RVRs glide slopes localizers, ATCTs, etc. Silicon controlled rectifier (SCR) type, L-828, constant current regulators (CCRs), are the likely sources of EMI due to their inherent operating characteristics. The following are some of the cautionary steps that may help decrease EMI and/or its adverse effects in the airport environment.

1) Cables for airfield lighting circuits should not be installed in the same conduit, cable duct or duct bank as control and communication cables.

2) Cables for airfield lighting systems should not be installed such that they cross control and/or communication cables.

3) In some cases, harmonic filters may be installed at the regulator output to reduce the EMI emitted by the CCR. These filters are available from some CCR manufacturers.

4) Spare control and communications cables should be grounded.

5) Inform manufactures, designers, engineers, etc. about the existing navigational equipment and the potential for interference.

6) Electromagnetic compatibility between new equipment and existing equipment should be a requirement in project contracts. Operational acceptance test(s) may be required to verify compliance.

The Federal Aviation Administration is modifying Advisory Circular 150-5345-10E, *Specification for Constant Current Regulators and Regulator Monitors* to decrease EMI in the airport environment.

For more information contact the FAA Office of Airport Safety and Standards, Engineering and Specification Division at (202) 267-8745.

FIGURES